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INVITED COMMENTARY

Comments regarding 'Limb Salvage Using Bypass to Perigeniculate Arteries'

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During the last decade, the number of extensive distal surgical revascularisation procedures for critical lower-limb ischaemia has increased rapidly. Infrainguinal bypasses to inframalleolar or pedal arteries are no exceptions anymore. However, a substantial part of the patients with critical limb ischaemia suffers from severe foot infections or necrosis. In those patients, as well as in the patients who lack patent below-the-knee run-off arteries, distal bypasses are technically demanding, prone to infection and will lead to disappointing clinical results.

In those patients, the use of infrainguinal bypasses to the perigeniculate arteries, as described by De Luccia and co-workers in this issue of the Journal, can be of great value.[1] Perigeniculate collateral arteries are muscular vessels that are usually atherosclerosis free even in patients with diabetes mellitus or chronic kidney disease. However, technical and clinical success of perigeniculate bypasses depend on several important factors, such as (1) diameter of the perigeniculate arteries (comparable to that of distal leg arteries) and (2) uninterrupted outflow via the collaterals to the ischaemic foot. Detailed preoperative imaging of the outflow, including the foot arteries, is therefore of utmost importance.

A useful alternative can be surgical revascularisation to an isolated or 'blind' popliteal artery segment (IPAS), with arteriographic proof of perigeniculate collateral arteries arising from that popliteal segment. Recently, Ballotta and co-workers reported their midterm results of 51 revascularisations (30 venous IPAS bypasses and 21 with use of polytetrafluoroethylene (PTFE)).[2] Five-year's patency rate in the series as a whole was $51.4 \pm 9.6\%$ and limb salvage rate was $90 \pm 4.3\%$. No significant difference was found between venous and PTFE reconstructions; however, the number of patients was limited. A former large series of revascularisations to IPAS did not show outcome differences concerning the type of graft (venous vs. prosthetic), both with acceptable outcome.[3] The advantage of IPAS reconstructions compared with perigeniculate dissection is the fact that the distal anastomosis can be performed by a standard medial infragenicular and sometimes supragenicular approach. The disadvantage of an IPAS revascularisation might be the risk of future atherosclerotic progression of the popliteal segment, which limits outflow and patency.

The question is whether and when minimal invasive percutaneous therapy will become the first-line treatment in patients with IPAS or outflow via sole perigeniculate arteries. Taking into account the rapid improvement in below-the-knee endovascular equipment, such as low-profile guidewires, balloons and (drug-eluting) stents, successful percutaneous revascularisation to a non-atherosclerotic, properly sized perigeniculate artery seems valuable and reasonable. The use of drug-eluting bioabsorbable stents in perigeniculate revascularisation might be of great value due to the complete degradation of the stent material in the long term, avoiding the risk of unnecessary bulky stent material in mechanically complex arterial segments.

Today, surgical revascularisation for The Inter-Society Consensus for Management of PAD (TASC D) femoro-popliteal lesions is recommended, and vascular surgeons should be aware of the good technical and clinical outcome of perigeniculate artery reconstructions. Moreover, young vascular surgeons should be trained in this technique so as

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to offer their patients with critical limb ischaemia all therapies to prevent major amputations.

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